1200 **2/** **1400**

2

1

$$v = f\,\lambda \qquad\qquad v = \lambda\,v$$

$$T = \frac{1}{f} \qquad\qquad f = \frac{1}{T}$$

$$v = \frac{\lambda}{T}$$

$$y(x,t) = A\cos(k\,x - \omega t)$$

$$\frac{\pi}{2}$$

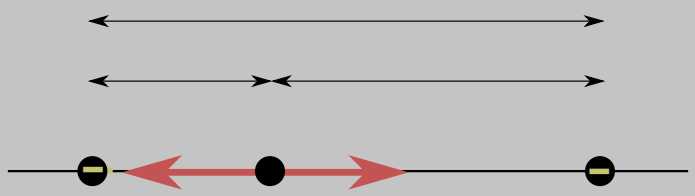
$$v(x,t) = \frac{\partial\ y(x,t)}{\partial t} = \omega A \sin(k\,x - \omega t)$$

1

2

	- ( )	- ( )
$\vec{F}_{31}$	$F_{31x} = F_{31}\cos\theta_{31}$ $= 16\cos 60$ $= 8\ N$	
$\vec{F}_{32}$	$F_{31x} = -6.4\ N$	$F_{31y} = 0$
	$F_{3\ net_x} = 1.6\ N$	$F_{3\ net_y} \approx 13.86\ N$

$q_1 = -3\ \mu C \qquad q_2 = -8\ \mu C$



$$E_1 = E_2$$

$$\frac{1}{4\pi\varepsilon_0}\frac{q_1}{r_1^2} = \frac{1}{4\pi\varepsilon_0}\frac{q_2}{r_2^2}$$

$$\frac{3\ \mu C}{x^2} = \frac{8\ \mu C}{(12\ cm - x)^2}$$

$$\sqrt{\frac{3}{x^2}} = \sqrt{\frac{8}{(12 - x)^2}}$$

$$\frac{1.732}{x} \approx \frac{2.828}{12 - x}$$

$$1.732\,(12 - x) \approx 2.828x$$

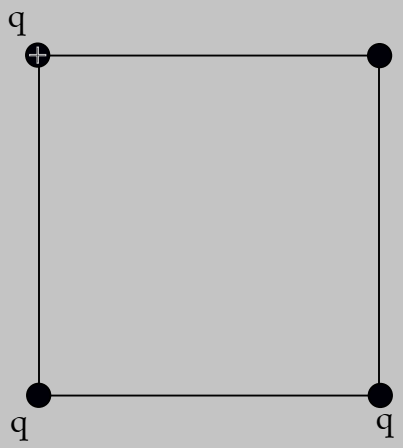
$$20.78 - 1.732x \approx 2.828x$$

$$20.78 \approx 4.560x$$

$$\therefore \quad x \approx 4.6\ cm$$

$q_1 = +8\ \mu C \quad q_2 = -5\ \mu C$

$q_3 = -12\ \mu C$



q_2 $r_2 \approx 28.3\ cm$

$$E_1 = \frac{1}{4\pi\varepsilon_0}\frac{q_1}{r_1^2} \approx 9\times10^9\ \frac{8\times10^{-6}}{(0.20)^2}$$

$$E_1 \approx 1.8\times10^6\ N/C$$

$$E_2 = \frac{1}{4\pi\varepsilon_0}\frac{q_2}{r_2^2} \approx 9\times10^9\ \frac{5\times10^{-6}}{(0.283)^2}$$

$$E_2 \approx 5.62\times10^5\ N/C$$

$$E_3 = \frac{1}{4\pi\varepsilon_0}\frac{q_3}{r_3^2} \approx 9\times10^9\ \frac{12\times10^{-6}}{(0.20)^2}$$

$$E_3 \approx 2.7\times10^6\ N/C$$

	- ( )	- ( )
$\vec{E}_1$	$E_{1x} = 1.8\times10^6\ N/C$	
	$E_{2x} = E_2 \cos$	
$\vec{E}_3$	$E_{3x} = 0$	$E_{3y} = -2.7\times10^6\ N/C$

$$E_{point} = \frac{1}{4\pi\varepsilon_0}\ \frac{q}{r^2}$$

- $dE_{infinitesimal} = \frac{1}{4\pi\varepsilon_0}\ \frac{dq}{r^2}$

dE

3

$r \approx 36.1\ cm$

$$V_{A\ net} = V_{A1} + V_{A2}$$

$$= \frac{1}{4\pi\varepsilon_0}\frac{q_1}{r_{A1}} + \frac{1}{4\pi\varepsilon_0}\frac{q_2}{r_{A2}}$$

$$= \quad 1$$

4 ,

$$\frac{1}{C_{series}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \ldots$$

$$V_{series} = V_1 + V_2 + V_3 + \ldots$$

$$C_{parallel} = C_1 + C_2 + C_3 + \ldots$$

$$q_{parallel} = q_1 + q_2 + q_3 + \ldots$$

5

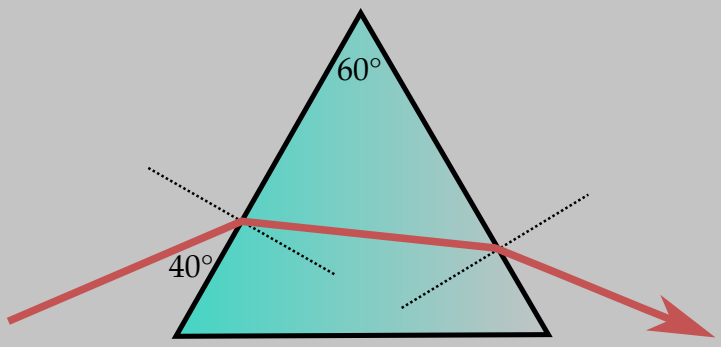
$$\vec{F}_B = q\vec{v} \times \vec{B} \qquad \vec{F}_E = q\,\vec{E}$$

$$\vec{v} \times \vec{B}$$

$$F_B = qvB \sin \phi_{vB}$$

	( )	( )
( )		
d_o ( )		
d_i ( )		

$n = 1.69$



$\theta_1 = 50$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$$

$$\sin\theta_2 = \frac{1.00 \sin 50}{1.69}$$

$$\sin\theta_2 \approx 0.453$$

$$\theta_2 \approx \sin^{-1} 0.453$$

$$\theta_2 \approx 27.0$$

$\theta_3 = 33$

$$n_3 \sin\theta_3 = n_4 \sin\theta_4$$

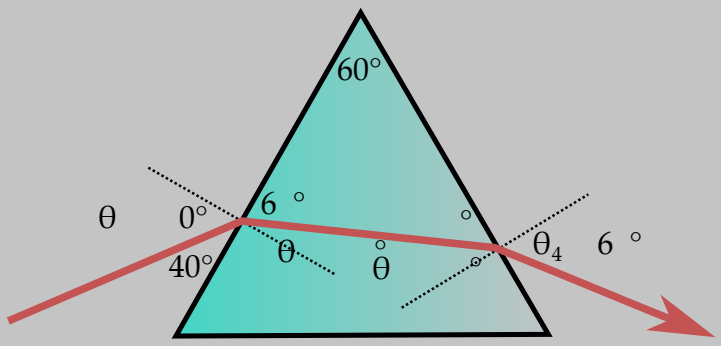
$$\sin\theta_4 = \frac{n_3 \sin\theta_3}{n_4}$$

$$\sin\theta_4 \approx \frac{1.69 \sin 33.0}{1.00}$$

$$\sin\theta_4 \approx 0.920$$

$$\theta_4 \approx \sin^{-1} 0.920$$

$$\theta_4 \approx 67.0$$



$v = f\lambda$ $v = \lambda\nu$

$T = \frac{1}{f}$ $f = \frac{1}{T}$

$v = \frac{\lambda}{T}$

$k = \frac{2\pi}{\lambda}$ $\omega = 2\pi f$

$y(x,t) = A\cos(kx - \omega t)$

$v(x,t) = {}^{\partial}$

$$\Phi_E = \oint \vec{E} \cdot d\vec{A} = \frac{q_{enclosed}}{\varepsilon_0}$$

$$V = \frac{1}{4\pi\varepsilon_0} \frac{q}{r}$$

$$U_E = \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r}$$

$$W = \Delta U_E = q \Delta V$$

$$I = \frac{\Delta q}{\Delta t}$$

$$C = \frac{q}{V} = \kappa$$

		α	
		β	
	Γ	γ	
	Δ	δ	
		ϵ ε	
		ζ	
		η	–
	Θ	θ	
		ι	
		κ	
	Λ	λ	
		μ	
		ν	
	Ξ	ξ	
		o	
	Π	π	
		ρ	
	Σ	σ	
		ι	
	Υ	υ	
	Φ	ϕ φ	
		χ	
	Ψ	ψ	
	Ω	ω	–